Preliminary Geologic Map of the Sacramento 30’ x 60’ Quadrangle, California

Compilation and Digital Preparation by

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INTRODUCTION

The *Preliminary Geologic Map of the Sacramento 30'x60' Quadrangle, California* was compiled from existing geologic mapping covering the area between 38°30' and 39° N. latitude and 121° and 122° W. longitude (Figure 1). This map was prepared by the Department of Conservation, California Geological Survey (CGS) and was supported in part by the U.S. Geological Survey (USGS) STATEMAP award No. G10AC00414.

This map is a compilation of existing geologic mapping from a number of sources (see index map on map sheet and references). Existing digital data were used in this compilation where available, as shown on Figure 2. For areas where digital data were not available, CGS digitized contacts and geologic features from scanned geologic maps.

Because some of the available digital data were compiled at larger scales, several small artificial fills and levees as well as several small bodies of rock within the Foothill Mélange are too small to be shown on the map. These features have been preserved in the digital database as separate feature classes and in some cases are represented on the map as point or line symbols.

BASE MATERIAL

The base materials used for the geologic map of the Sacramento 30'x 60' quadrangle consists of a shaded-relief and a topographic map image. The topographic base map is taken from the USGS digital raster graphic (DRG) of the Sacramento 1:100,000-scale quadrangle available from the California Spatial Information Library (CaSIL) (http://www.atlas.ca.gov/). The shaded-relief image is derived from a 30 meter resolution digital elevation model (DEM) obtained from the National Elevation Dataset (NED).

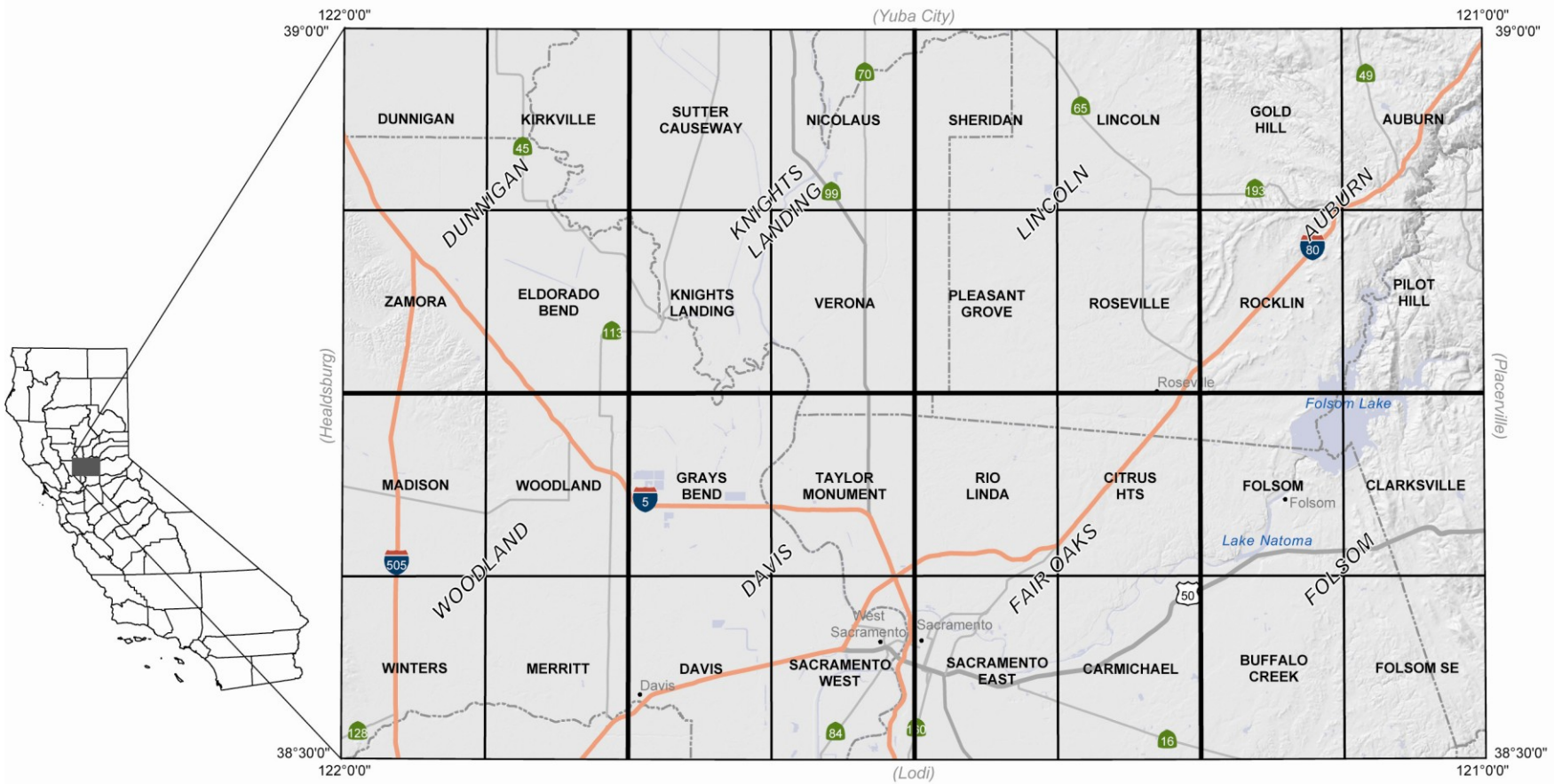

Figure 1. Index map showing 7.5-minute and 15-minute quadrangles within the Sacramento 30x60-minute quadrangle. 7.5-minute quadrangle names are shown in bold and 15-minute quadrangle names are shown in italics.

DESCRIPTION OF MAP UNITS

(For approximate stratigraphic relationships, refer to Figure 2)

af **Artificial fill (Historic)** - May be engineered and/or non-engineered. Locally includes artificial dam fill and tailings associated with dredge mining.

alf **Artificial levee fill (Historic)** - May be engineered and/or non-engineered.

t D**redge tailings (Historic)** - Gravel, cobbles, boulder, sand and silt resulting from historic mining operations.

Qhc **Stream channel deposits (late Holocene to modern <150 years)** - Deposits in active, natural stream channels consisting of loose alluvial sand, gravel, and silt.

Qhay **Alluvial deposits, undivided (latest Holocene, <1,000 years)** - Fluvial sediment deposited on the modern flood plain.

Qhl **Fan levee deposits (Holocene)** – Natural levees deposited as long, low ridges oriented down fan. The deposits contain coarser material than the adjoining interlevee areas.

Qha **Alluvium, undivided (Holocene)** - Alluvium deposited on fans, terraces, or in basins. Sand, gravel, and silt that are poorly to moderately sorted. Mapped where separate types of alluvial deposits are not delineated.

Qhf **Alluvial fan deposits (Holocene)** - Alluvial fan sediment deposited by streams emanating from mountains as debris flows, hyper-concentrated mudflows, or braided stream flows. Sediments include sand, gravel, silt and clay, that are moderately to poorly sorted, and moderately to poorly bedded; Qhff - fine-grained facies.

Qhb **Basin deposits (Holocene)** – Fine grained sediments of late Holocene age with horizontal stratification deposited by standing or slow moving water in topographic lows.

Qa **Alluvium, undivided (latest Pleistocene to Holocene)** - Undivided alluvium consisting of flat, relatively undissected fan, terrace, basin deposits, and small active streams.

Qf **Alluvial fan deposits (latest Pleistocene to Holocene)** - Sand, gravel, silt, and clay mapped on gently sloping, fan-shaped, relatively undissected alluvial surfaces.

Qls **Landslides (Pleistocene to Holocene)** – Consists of chaotic deposits of sand, silt, clay, boulders, and blocks of bedrock.

Qm **Modesto Formation (Late Pleistocene)** – Arkosic alluvium, sand with minor gravel and silt, forming alluvial terraces, alluvial fans and abandoned channel ridges along streams and in valleys. **Qm_2** – Upper member; unconsolidated, unweathered alluvium forming terraces that are topographically lower than Qm_1. Qm_1 – Lower member; unconsolidated, slightly weathered alluvium that forms terraces that are topographically higher than Qm_2.

Qr **Riverbank Formation (Middle to Late Pleistocene) -** Arkosic alluvium, sand with and silt, forming alluvial terraces,

and dissected alluvial fans along streams on the southeast side of the Sacramento Valley. Qr_3 – Upper unit. Qr_2 – Middle unit. Qr_1 – Lower unit. Units Qr_3 and Qr_2 were previously mapped as Qru and Qrl respectively and were reclassified based on correlation to mapping by Atwater and Marchand (1980). Similar to the Modesto Fm., The upper, middle and lower units of the Riverbank Fm. form terraces that increase in topographic position with age.

Qoa **Alluvial deposits, undivided (early to late Pleistocene)** - Alluvial fan, stream terrace, basin, and channel deposits. Topography is gently rolling with little or no original alluvial surfaces preserved; moderately to deeply dissected. Qoa_1 – Unit 1. Qoa_2 – Unit 2. Qoa_3 – Unit 3. Qoa_4 – Unit 4. Due to the difference in source material and depositional environment from deposits in the eastern portion of the Sacramento Valley, Modesto, Riverbank and Red Bluff Formations previously mapped in the western portion of the Sacramento Valley have been reclassified as Qoa Units 1-4 based on their relative ages.

Qtl **Turlock Lake Formation (Pleistocene) –** Arkosic alluvium, sand with some silt and minor gravel. Deeply weathered and dissected.

Pl **Laguna Formation (Pliocene) –** Cobble gravel, sand, and minor silt of mixed metamorphic, granitic, and volcanic source.

Pth **Tehama Formation (Pliocene)** – Poorly consolidated, nonmarine, pale green, gray and tan siltstone, quartz arenite sandstone, tuff, and pebble to cobble conglomerate.

MPm **Mehrten Formation (Miocene and early Pliocene) –** Undivided mudstone, claystone, siltstone, minor sandstone and conglomerate, and tuff breccia derived from andesitic volcanic source areas near the crest of the Sierra Nevada. MPmc - cemented, pooly bedded cobble and boulder conglomerate. MPmb – very hard caprock of volcanic mudflow tuff breccia.

OMvs **Valley Springs Formation (Oligocene to Miocene) –** Rhyolitic sandstone, ash, interbedded tuffs, and claystone.

Ei **Ione Formation (Eocene) –** Light-colored conglomerate, sandstone, and claystone.

Kc **Chico Formation (Cretaceous) –** Fossiliferous marine sandstone and minor siltstone.

Kr **Rocklin Pluton (lower Cretaceous) –** Light gray silicic quartz diorite.

Jp **Penryn Pluton (upper Jurassic) –** Medium- to coarse-grained quartz diorite.

Jch **Copper Hill Volcanics (Jurassic) –** Mafic to andesitic pyroclastic rocks, lava and pillow lava with subordinate felsic porphyritic and pyroclastic rocks.

Jss **Salt Springs Slate (Jurassic) –** Dark gray slate with subordinate tuff, greywacke, rare conglomerate and mica schist.

Jgo **Gopher Ridge Volcanics (Jurassic) –** Metamorphosed mafic to andesitic pyroclastic rocks, lava and pillow lava with subordinate felsic porphyritic and pyroclastic rocks.

Mzd **Diorite, undivided (Mesozoic)**.

Mzg **Granite, undivided (Mesozoic)**

Mzqd **Quartz diorite, undivided (Mesozoic)**

Foothill Melange (Mesozoic) – Chaotic mixture of metasedimentary and metavolcanic rocks of varying lithologies and ages. Includes bodies of gabbroic and ultramafic rocks and lenses of carbonate rocks. Coherent rocks masses large enough to be shown on this map are as follows:

mv **Metavolcanic rock**

mvs **Metavolcanic and metasedimentary rock, undivided**

ms **Metasedimentary rock**

sp **Serpentine and peridotite**

sa **Serpentine and amphibole**

py **Pyroxenite and metapyroxenite**

pg **Pyroxenite and gabbro**

gb **Gabbro and metagabbro**

ls **Limestone**

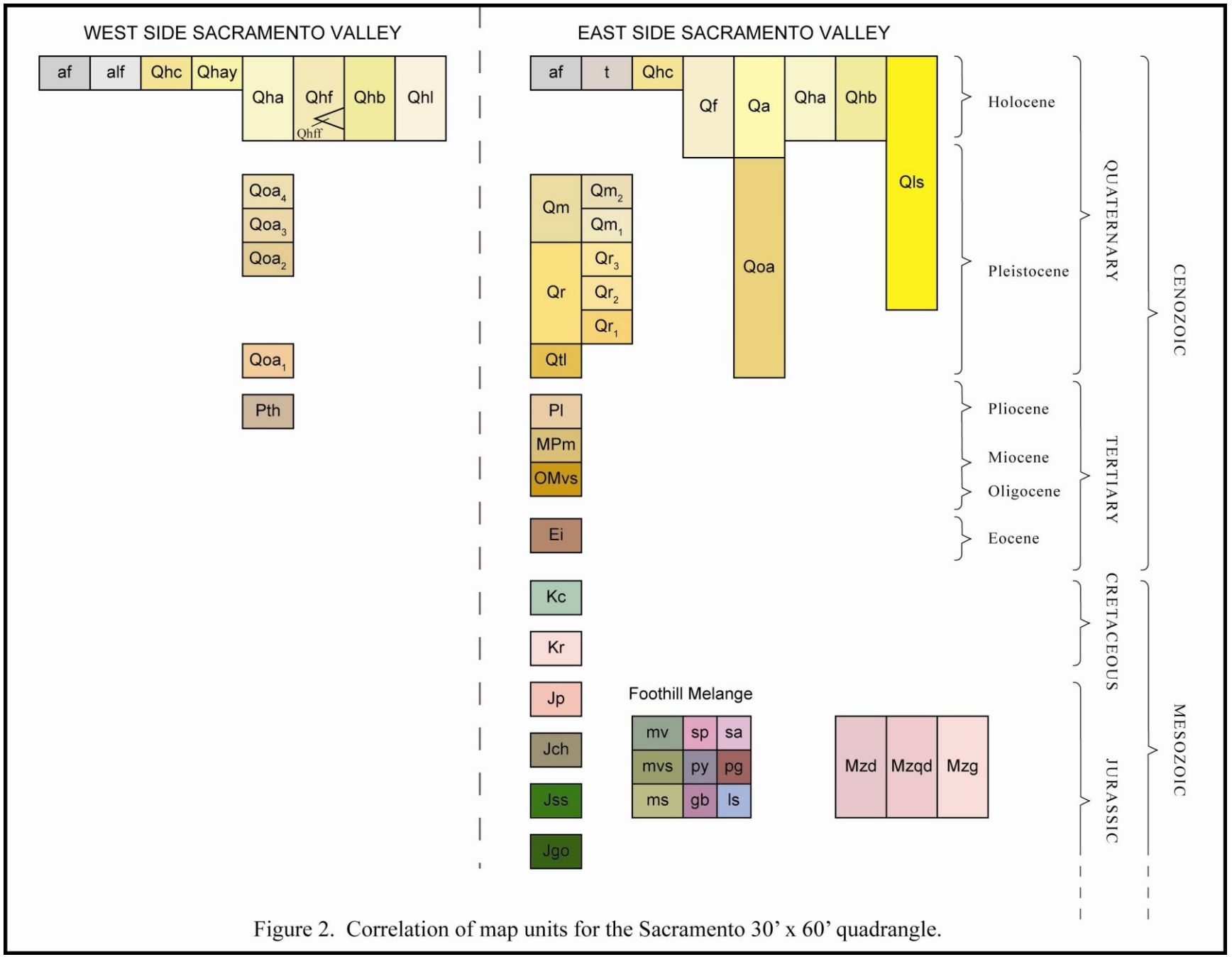

Figure 2. Correlation of map units for the Sacramento 30' x 60' quadrangle.

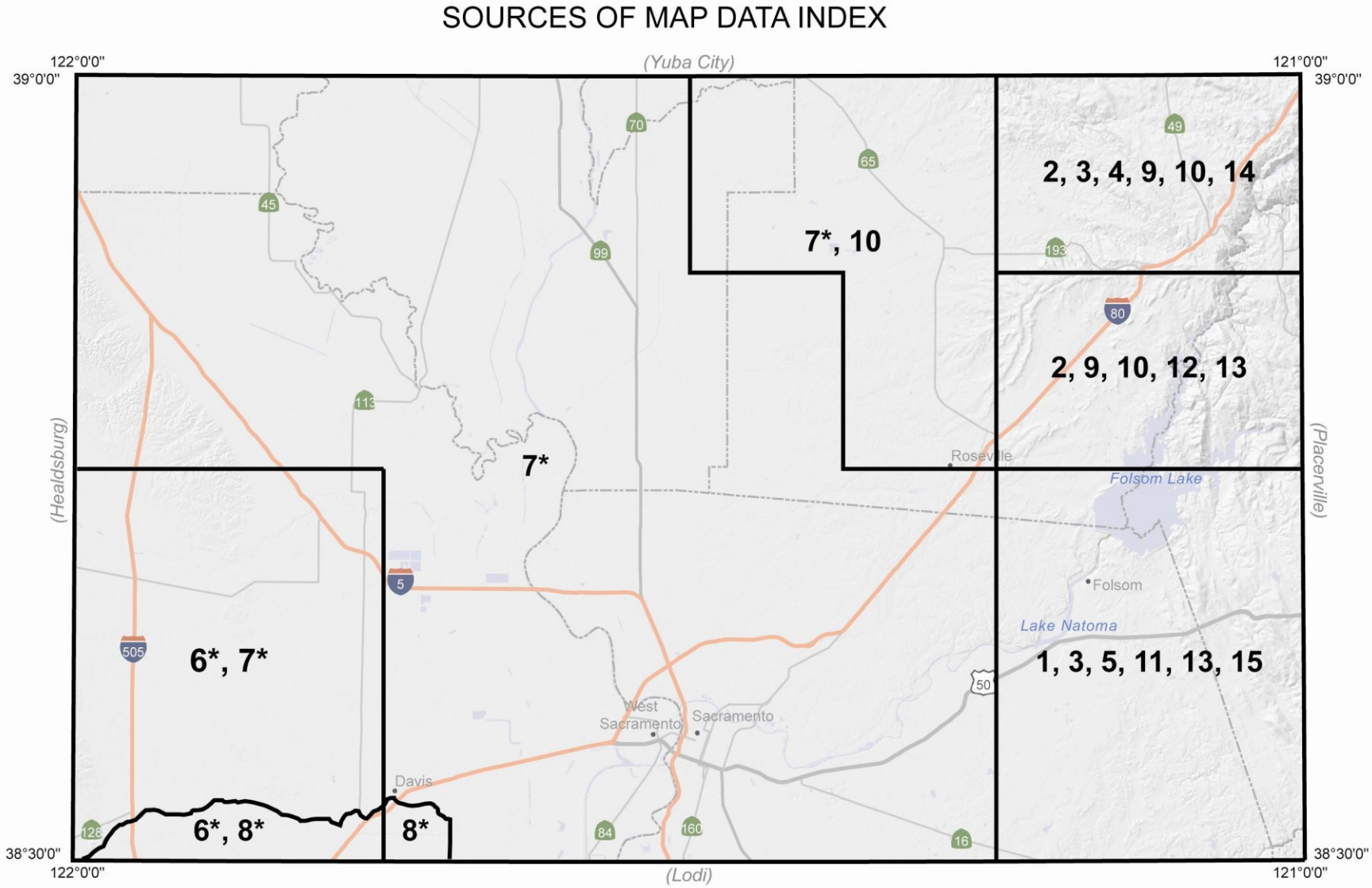

Figure 3. Index map showing sources of map data within the Sacramento 30' x 60' quadrangle. Sources of existing digital data used in this compilation are indicated with an asterisk.

SOURCES OF MAPPING FOR THE SACRAMENTO 30' x 60' QUADRANGLE

(See Figure 3. For complete reference citations see the references section following this list of mapping sources.)

1. Bartow, J.A. and Helley, E.J., 1979, Preliminary geologic map of Cenozoic deposits of the Folsom area, California: U.S. Geological Survey Open-File Report 79-550, scale 1:62,500.

2. Bartow, J.A. and Helley, E.J., 1979, Preliminary geologic map of Cenozoic deposits of the Auburn quadrangle, California: U.S. Geological Survey Open-File Report 79-386, scale 1:62,500.

3. Behrman, P.G., 1978, Paleogeography and structural evolution of a middle Mesozoic volcanic arc-continental margin, Sierra Nevada foothills, California: University of California, Berkeley, Ph.D. dissertation, 301 p.

4. Clark, L.D. and Huber, N.K., 1975, Geologic observations and sections along selected stream traverses, northern Sierra Nevada metamorphic belt, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-690, scale 1:62,500.

5. Department of Water Resources Bulletin 118-3, 1974, Evaluation of Groundwater Resources, Sacramento County: Department of Water Resources, Sacramento, 139 p., approximate scale 1:100,000.

6. Graymer, R.W., Jones, D.L., Brabb, E.E., 2002, Geologic map and map database of northeastern San Francisco Bay region, California, [including] most of Solano County and parts of Napa, Marin, Contra Costa, San Joaquin, Sacramento, Yolo, and Sonoma Counties: U.S. Geological Survey Miscellaneous Field Studies Map MF-2403.

7. Helley, E.J. and Harwood, D.S., 1985, Geologic map of the Late Cenozoic deposits of the Sacramento Valley and northern Sierran foothills, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-1790, scale 1:62,500.

8. Knudsen, K.L., Sowers, J.M., Witter, R.C., Wentworth, C.M., and Helley, E.J., 2000, Preliminary maps of Quaternary deposits and liquefaction susceptibility, nine-county San Francisco Bay Region: a digital database: U.S. Geological Survey Open-File Report 00-444.

9. Kohler, S.L., 1983, Mineral Land Classification of the Auburn 15-minute Quadrangle, El Dorado and Placer Counties, California: California Department of Conservation, Division of Mines and Geology Open-File Report 83-37, 48 p., scale 1:48,000.

10. Livingston, J.G., 1976, Handbook of environmental geology: Placer County, California: Unpublished report prepared for Placer County Planning Department (includes 21 1:24,000-scale geologic maps).

11. Loyd, R.C., 1984, Mineral Land Classification of the Folsom 15-minute Quadrangle, Sacramento, El Dorado, Placer and Amador Counties, California: California Department of Conservation, Division of Mines and Geology Open-File Report 84-50, 44 p., scale 1:48,000.

12. Olmsted, F.H., 1971, Pre-Cenozoic geology of the south half of the Auburn 15-minute Quadrangle, California: U.S. Geological Survey Bulletin 1341, 30 p., scale 1:48,000.

13. Springer, R.K., 1971, Geology of the Pine Hill intrusive complex, El Dorado County, California: University of California, Davis, unpublished Ph.D. dissertation, 362 p., scale 1:24,000.
14. Taylor, G.C., 1979, Geologic reconnaissance of the north half of the Auburn 15-minute quadrangle: California Division of Mines and Geology, unpublished report and map for State Map Project, scale 1:24,000.
15. Tierra Engineering Consultants, Inc., 1983, Geologic and seismologic investigations of the Folsom, California area: Unpublished report prepared for U.S. Army Corps of Engineers under Contract No. DACW05-82-C-0042.

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